Crystalline-Based Phonon Collision Matrix Computing System: A Near-Infinite Qubit Quantum Computer Concept

26 July 2022
Simon Edwards
Research Acceleration Initiative

Introduction

The nebulous term, "Quantum Computer" is thrown around a lot these days. I would prefer not to call my system a quantum computer given the bad reputation early promoters had for making big promises and failing to deliver. Nonetheless, if verified experimentally, what I am about to describe would technically constitute a quantum computer.

Abstract

That said, I have a new concept to offer that permits for a phenomenal number of qubits in each processing core that hinges on the interaction of phonons (quantized sound energy) within a crystalline structure and takes advantage of the way in which two distinct clusters of phonons moving across the matrix at different angles can be made to intercept one another at a controlled point within the crystal core so as to cause the phonons to be uniquely altered before arriving at the opposite side of the perimeter of the core.

Rather than a total redirection of the angular momentum of the vibrations, I believe we could expect to see a portion of the energy diffuse diagonally toward the upper right in that scenario, but also a measurable decrease in the energy arriving at the "top" and "right" panels with the bulk of the energy still arriving at the top and right facets. The exact point at which collisions take place would dictate the vector of any redirected phononic energy. Thus, if a pulse were emitted at staggered timings, it would cause the point of phononic intersection to vary, leading to different and potentially infinitely unique combinations of signal patterns and strengths striking the perimeter. The point of intersection and thus, the input characteristics could be guessed based upon the received echo. Head-on collisions, of course, would result in cancellation. Collisions stemming from emissions along acute angles would result in some dampening, but far less than seen with 90-degree collisions. Complex combinations of phonon emissions could create resonance patterns of astounding complexity. The panels of the proverbial skating rink would ultimately convert these phonons back into measurable electrical energy upon their arrival. The number of facets, the number of echoes, the offset of the X and Y phonons in terms of timing as well as the number of phonons colliding at the same time at different points in the matrix would all exponentially increase the number of possible combinations of patterns achievable in each computational step.

The point of intersection of the phonon clusters could be controlled through accurate timing control of the pulses. Although these phonons would be traveling at the speed of sound (in a crystal) and the timing would not need to be as exact as, say, if you were trying to hit an electron with another electron,

nanosecond precision would remain a necessity. Different types of and configurations of crystals would have various advantages and disadvantages in this field of computing.

Conclusion

As for the scale, there is no theoretical maximum, meaning that Phononic Collision Matrices have the potential to form the basis of the perfect quantum computer.